

A 74 MM. POLYODON.

14.

C. H. DANFORTH.



[Reprinted from BIOLOGICAL BULLETIN, Vol. XX., No. 4, March, 1911.]





A 74 MM. POLYODON.

C. H. DANFORTH.

(From the Anatomical Laboratory of Washington University.)

The developmental stages of *Polyodon* have long been sought by biologists but, so far as published accounts show, neither the fertilized eggs nor the young embryos have ever been seen. For this reason it seems advisable to announce the capture of a specimen smaller than any previously recorded.

The individual in question was taken from the Mississippi River near St. Louis on July 12, 1910. It was immediately killed and fixed in Zenker's fluid and hardened in alcohol. In the latter medium it measured 74 mm. from the tip of its snout to the tip of its tail. The figures show three views of this embryo after preservation.

The features in which it seems to differ most from the adult are the relatively large barbels, the rostrum, and the fins and tail. The general outline of the body, too, appears rather more fusiform, but a number of measurements failed to bring out any marked peculiarities in this respect.

The barbels, represented in Figs. 1 and 2, are approximately a millimeter long, or .013 of the total length of the fish. This is relatively many times their adult size. They are, however, small and apparently rudimentary even in the young, and a macroscopic examination of them revealed no new points of interest. In fish of 170-175 mm. they are still relatively large as compared with the adult.

The rostrum of the embryo is somewhat unlike that of the adult in outline. In the former (cf. Figs. 2 and 3) it tapers in width from the nostril to the tip with only a slight constriction near the middle, whereas in the adult there is a characteristic and generally well marked constriction of the proximal half and usually a distinct dilation of the distal half, giving the whole its typical paddle-shaped appearance. In an embryo of 89 mm. the rostrum is similar to that of the 74-mm. specimen, but in

individuals of 170 mm. and over the organ is much more truly spatulate in outline. With the exception of the specimen under consideration, the width of the rostrum was found to be relatively greater in the small fish than in the larger ones, but width of snout and contour are not very closely correlated so that some rather wide snouts are not very spatulate in outline.

The length of the rostrum at different ages is shown in the

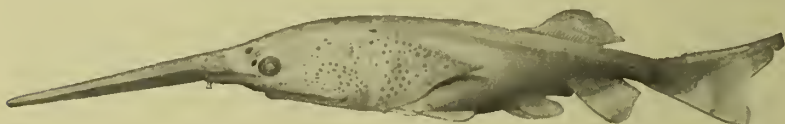


FIG. 1. Lateral view of a specimen of *Polyodon spathula* measuring 74 mm. total length.

accompanying table based on measurements of twenty specimens, ten varying in length from 74 mm. to 200 mm., and ten from 1,000 mm. to 1,300 mm. Intermediate stages were not available. In this table the second column gives the total length from tip of snout to tip of tail, the third gives the length of the rostrum measured from its tip to a line passing between the anterior corners of the eyes, and the fifth column shows the width of the rostrum at the beginning of its distal third. The decimals in the

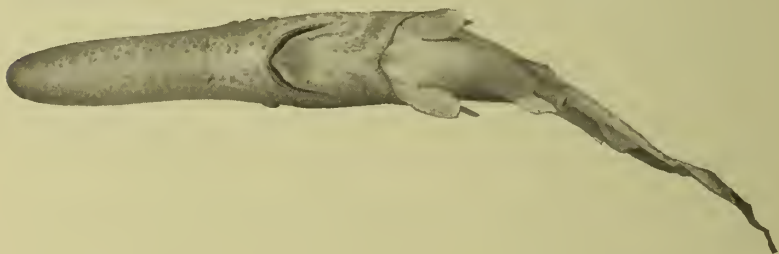


FIG. 2. Ventral view of the specimen shown in Fig. 1.

sixth column are obtained in each case by dividing the length of the rostrum by the total length of the fish. Professor Stockard¹ measured in this way a number of adult *Polyodon* from 24 in. (about 600 mm.) to 69 in. (about 1,725 mm.) and found an interesting correlation between the size of the fish and the length

¹Stockard, Charles R., "Observations on the Natural History of *Polyodon spathula*," *Amer. Nat.*, Vol. XLI., pp. 753-766, 1907.

of the rostrum. His tables show a steady increase in the relative length of the rostrum in passing from larger to smaller individuals. My own measurements reveal the presence of somewhat striking individual variations, but it will be seen, nevertheless, on examining the table that in the first ten the length of the snout is, on the whole, gradually increasing while with the latter ten the reverse is the case. The smallest fish measured by Professor Stockard was approximately 600 mm. in length and had a rostrum represented by the fraction .333. The largest of the small fish measured for the table presented herewith was 200 mm. long with a rostrum represented by .390. The available data, therefore, seem to indicate that the rostrum attains its maximum

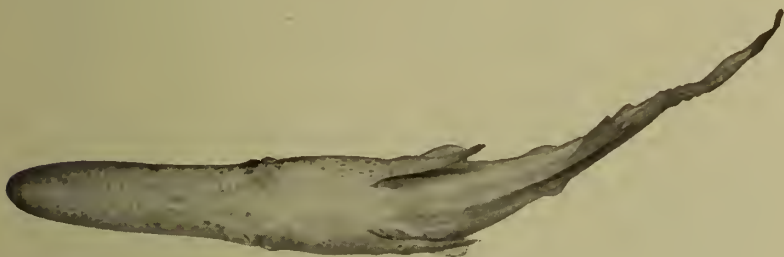


FIG. 3. Dorsal view of the same fish.

development at a time when the fish is from 200 mm. to 600 mm. in length. The biology of the species is too little known to enable one to say whether or not there is any functional significance in such a development at this time.

In adult *Polyodon* the fins show a marked angularity. In the embryo they are rounded and much less distinctive. This difference will become evident on comparing the figures accompanying Professor Stockard's article with those presented here. The position of the various fins does not seem to differ greatly between the small and the large fish.

The tail of the embryo is rather strikingly unlike that of the adult. It is much more obviously heterocercal and the dorsal part is somewhat lobed as shown indistinctly in Fig. 1. The small terminal lobe, which is not found in the adult, seems to be either without rays or with rays only feebly developed. It is a fleshy mass with apparently no tendency to become elongated into a slender filament. It is not clear from the material at

TABLE OF MEASUREMENTS.

Fixing Fluid.	Total Length, mm.	Length of Rostrum, mm.	Length of Operculum, mm.	Width of Rostrum, mm.	Rostrum by Total Length, Decimal.
Zenker's	74	22	19	6	.297
Formalin	89	26	21	9	.292
Zenker's	91	27	22	8	.297
Formalin	104	34	27	11	.327
"	107	34	28	12	.318
"	140	48	35	16	.343
"	144	49	36	16	.340
"	170	58	46	18	.341
"	175	58	46	18	.331
"	200	78	50	20	.390
"	1,000	260	300	72	.260
"	1,030	290	280	80	.282
"	1,050	310	300	75	.295
"	1,070	260	290	72	.243
"	1,090	300	300	78	.275
"	1,180	320	340	80	.271
"	1,200	340	360	80	.283
"	1,210	330	370	90	.273
"	1,210	310	330	80	.256
"	1,300	330	370	75	.254

hand whether this portion disappears with growth or becomes incorporated with the rest.

Measurements were made upon several other parts of the body but the data obtained do not seem to indicate any special peculiarities beyond those already mentioned. Of these measurements the length of the operculum is alone included in the table, the figures in the fourth column representing the distance in millimeters from the posterior corner of the eye to the tip of the opercular flap.

The age of the specimen cannot, of course, be stated, but it seems probable that it is from the brood of the current season. Professor Stockard's observations indicate an early spawning. During the summer some specimens only slightly larger than the one described were taken, while others had reached 175 mm. or more in length, and in the winter specimens from six to ten inches long are captured. Consequently, if these fragmentary observations are to be trusted, it seems probable that these fish hatch early in the spring and grow rapidly during the first year, attaining a length of possibly ten inches in this time.

The writer is indebted to Drs. R. J. Terry and V. E. Emmel for securing and preserving the specimens studied. The drawings are the work of Mr. W. T. Oliver.